

SECTION 32 01 90.16 Amending Soils
ProGanics[™] Biotic Soil Media[™] (BSM[™])

GENERAL

1.01 SUMMARY

- A. This section specifies the hydraulically-applied Biotic Soil Media[™] (BSM[™]), ProGanics[™] BSM. ProGanics BSM is designed as a biodegradable alternative to topsoil to accelerate development of depleted soils/substrates with low organic matter, low nutrient levels and limited biological activity. ProGanics BSM is made in the United States, plastic-free, non-toxic and contains 100% recycled bark and wood fibers that have been phytosanitized to eliminate potential weed seeds and pathogens—prior to the introduction of soil building components. This proprietary blend of soil building components includes high-viscosity colloidal polysaccharide biopolymers, biochar, seaweed extract, humic acid, endomycorrhizae and beneficial bacteria.
- B. Related Sections: Other Specification Sections, which directly relate to the work of this Section include, but are not limited to the following:
1. *Section 01 57 00 – Temporary Erosion and Sediment Control*
 2. *Section 02 24 23 – Chemical Sampling and Analysis of Soils*
 3. *Section 31 00 00 – Earthwork*
 4. *Section 31 25 00 – Erosion and Sedimentation Controls*
 5. *Section 31 91 00 – Planting Preparation*
 6. *Section 32 92 00 – Turf and Grasses*

1.02 SUBMITTALS

- A. Product Data: Submit manufacturer's product data and installation instructions. Include required substrate preparation, list of materials and application rate.
- B. Certifications: Manufacturer shall submit a letter of certification that the product meets or exceeds all technical and packaging requirements and is made in the U.S.A.

1.03 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials and products in UV and weather-resistant factory labeled packages. Store and handle in strict compliance with manufacturer's instructions and recommendations. Protect from damage, weather, excessive temperatures and construction operations.

PRODUCTS

2.01 ACCEPTABLE MANUFACTURER

- A. PROFILE Products LLC
 750 Lake Cook Road – Suite 440
 Buffalo Grove, IL 60089
 International - +1-847-215-1144
 United States and Canada – 800-366-1180 (Fax 847-215-0577)
www.profileproducts.com

2.02 MATERIALS

- A. The Biotic Soil Media shall be ProGanics BSM and conform to the following typical property values when uniformly applied at a rate of 3,500 pounds per acre (3,920 kilograms/hectare) under laboratory conditions.

Property	Test Method	Tested Value (English)	Tested Value (SI)
Physical*			
Topsoil & Engineered Soil Amendment	ASTM D5268-19	Compliant	Compliant
Organic Material	ASTM D586	≥ 94%	≥ 94%
Ground Cover	ASTM D65671	≥ 99%	≥ 99%
Water Holding Capacity	ASTM D7367	≥ 900%	≥ 900%
pH	ASTM D1293	6.0 ± 1.0	6.0 ± 1.0
Carbon:Nitrogen (C:N) Ratio	ASTM E1508 & EPA Method 1687	50:1 ± 10	50:1 ± 10
Material Color	Observed	Brown	Brown
Performance*			
Cover Factor ²	ASTM D8298-Type 1	≤ 0.014	≤ 0.014
% Effectiveness ³	ASTM D8298-Type 1	≥ 99% ⁴	≥ 99% ⁴
Vegetation Establishment	ASTM D7322	≥ 850%	≥ 850%
Topsoil Alternative	ASTM D5268-19	Compliant	Compliant
Environmental*			
Ecotoxicity ⁵	EPA 2021.0	Non-Toxic	Non-Toxic
Biodegradability	ASTM D5338	Yes	Yes
Certified BioPreferred® Biobased Content	ASTM D6866	100%	100%
EPA Metal Limits	EPA 503 Metal Limits	Pass	Pass
Pathogen Reduction	40 CFR 503 Class A Compost	Pass	Pass
Elemental Impurity Limits	ASTM D8082	Pass	Pass
Carbon Footprint ⁶	Life Cycle Assessment	≤0.5 Unit CO ₂ E/ Unit of Product ⁷	≤0.5 Unit CO ₂ E/ Unit of Product ⁷

* When uniformly applied at a rate of 3,500 pounds per acre (3,900 kilograms/hectare) under laboratory conditions. 1. ASTM test methods developed for Rolled Erosion Control Products that have been modified to accommodate Hydraulic Erosion Control Products. 2. Cover Factor is calculated as soil loss ratio of treated surface versus an untreated control surface. 3. % Effectiveness = One minus Cover Factor multiplied by 100%. 4. Performance Property values derived from testing of ProMatrix Engineered Fiber Matrix (EFM) applied at 3,500 pounds per acre (3,900 kilograms/hectare) over ProGanics at an application of 3,500 pounds per acre (3,900 kilograms/hectare). 5. 48-hour LC50 > 100% - LC50 refers to the percent concentration of a substance in water when 50% percent mortality of an organism is reached. 50% mortality of the tested species (*Daphnia magna*) could not be achieved when subjected to 100% effluent concentration proving the material to be acutely non-toxic. 6. Cradle to factory gate (Conover,

NC) life cycle assessment. 7. "Carbon dioxide equivalent" or CO₂e is a term for describing different greenhouse gases in a common unit. For any quantity and type of greenhouse gas, CO₂e signifies the amount of CO₂ which would have the equivalent global warming impact. The unit of CO₂e per unit of product is a consistent ratio based on mass, regardless of what unit of mass is chosen. For instance, there is 0.5 kg of CO₂e per kg of product or 0.5 oz CO₂e per oz of product.

2.03 COMPOSITION

- A. All components of the ProGanics BSM shall be pre-packaged by the manufacturer to assure both material performance and compliance with the following values. No chemical additives with the exception of fertilizer, soil neutralizers and biostimulant materials should be added to this product.
1. Thermally Processed* bark and wood fibers (within a pressurized vessel) – 89%
*Heated to a temperature greater than 380 degrees Fahrenheit (193 degrees Celsius) for 5 minutes at a pressure greater than 50 psi (345 kPa)
 2. Proprietary blend of polysaccharide polymers, biochar, seaweed extract, humic acid, endomycorrhizae and beneficial bacteria – 11%
 3. Moisture Content – 12%

2.04 PACKAGING

- A. Bags: Net Weight – 50 lb (22.7 kg), UV and weather-resistant plastic film
Pallets: Weather-proof, stretch-wrapped with UV resistant pallet cover
Pallet Quantity: 40 bags/pallet or 1 ton (909 kg)/pallet

EXECUTION

3.01 SOIL TESTING

- A. Soil Samples shall be taken and sent to a third-party, independent lab for analysis and in compliance with Section 02 24 23 – Chemical Sampling and Analysis of Soils, if applicable.
- B. The tests shall include analysis and interpretation of results.
- C. The soil testing methods used shall be compliant with recognized agronomic testing standards, as outlined in Section 02 24 23, for revegetation of disturbed sites.
- D. Soil Analysis shall include results for:
1. Soil pH
 2. Soluble Salts
 3. Excess Carbonate
 4. Organic Matter
 5. Nutrient readings for:
 - i. Nitrogen, Phosphorus, Potassium
 - ii. Magnesium, Calcium, Sodium, Manganese, Sulfur, Zinc, Copper, Iron, Boron
 6. Cation Exchange Capacity
 7. Percent Base Saturation Sodium
- E. BioPrime™, JumpStart™, Aqua-pHix™ and NeutralLime™ Dry or other amendments shall be specified according to Section 32 01 90.16 – Amending Soils and applied with the hydroseeding slurry at Manufacturer recommended rates based on soil test results.

3.02 VEGETATION SPECIES SELECTION

- A. Once soils have been analyzed for agronomic potential and amendment recommendations, selection of suitable plant species for achieving sustainable growth and effective erosion control is vital. Seed selection can be performed by a qualified seed supplier, consulting professional and/or regulatory agency. In lieu of this, a warm, extreme warm, or cool season Vegetator® variety mix can be utilized. Species selection and establishment shall be compliant with Section 32 92 00 – Turf and Grasses, if applicable.
- B. Site and project specific information considered for species selection shall include:
1. Project Location and Planning
 - i. Climate
 - ii. Elevation
 - iii. Aspect
 - iv. Slope/Gradient
 - v. Permanent or Temporary Planting
 - vi. Installation Date(s)
 2. Soil Conditions
 - i. Soil Texture
 - ii. Soil pH
 - iii. Toxicities/Deficiencies noted in the previous section.
 3. Site Maintenance Requirements
 - i. Mowing
 - ii. Irrigation
 - iii. Animal grazing preference
 4. Preferred Vegetation
 - i. Drought Tolerant
 - ii. Native Vegetation
 - iii. Shrub Species
 - iv. Turf Grasses
 - v. Cool Season
 - vi. Warm Season
 - vii. Blend of Cool and Warm Season
 - viii. Legume Species
 - ix. Cover Crops

3.03 SUBSTRATE PREPARATION

- A. Examine substrates and conditions where materials will be applied. Apply product to geotechnically stable slopes that have been designed and constructed to divert runoff away from the face of the slope. Do not proceed with installation until satisfactory conditions are established.
- B. Depending upon project sequencing and intended application, prepare seedbed in compliance with other specifications under Section 1.01 B

3.04 INSTALLATION

- A. Strictly comply with equipment manufacturer's installation instructions and recommendations. Use approved hydroseeding machines. To achieve optimum soil surface coverage, apply BSM from opposing directions to soil surface. Erosion control products, slope interruption devices or water diversion techniques should be used in conjunction with this product. No chemical additives with the exception of fertilizer, soil neutralizers and biostimulant materials should be added to this product.

- B. For Revegetation: To ensure proper application rates, measure and stake area.

For best results, allow BSM to dry slightly prior to application/installation of erosion control products; more rapid drying will occur when temperatures exceed 60°F (15°C). Drying times may be accelerated in high temperature, low humidity conditions with product applied on dry soils. Use caution to insure overspray of hydraulic erosion control product does not cause movement of the BSM. When installing rolled erosion control products over BSM, take caution to minimize disturbance of the treated surface and avoid excessive foot traffic.

- C. Mixing: A mechanically agitated hydroseeding machine is strongly recommended:
1. *Fill mechanically agitated hydroseeder with water to at least 1/3 of displacement. Turn pump on and thoroughly purge pump and pre-wet lines. Turn pump off.*
 2. *Turn agitator on and load low density materials first (i.e. seed).*
 3. *Continue slowly filling tank with water while loading BSM and soil amendments.*
 4. *Consult application and loading charts to determine number of bags to be added for desired area and application rate. Mix at a rate of 100 lb of BSM per 100 gallons (45.4 kg/379 liters) in machines equipped with gear or positive displacement pumps and 75 lb of BSM per 100 gallons (34.0 kg/379 liters) in machines with centrifugal pumps. Contact Equipment manufacturer to confirm optimum mixing rates.*
 5. *All BSM should be completely loaded before water level reaches 75% of the top of tank.*
 6. *Add fertilizer and other heavier materials and continue mixing.*
 7. *Top off with water and mix until all material is fully broken apart and hydrated (minimum of 10 minutes increase mixing time when applying in cold conditions). This is very important to allow the BSM to fully hydrate.*
 8. *Shut off recirculation valve to reduce potential for air entrainment within the slurry.*
 9. *Slow down agitator to very low speed and start applying with optimum nozzle.*
 10. *Spray in opposing directions for maximum soil coverage.*
 11. *Return to water source as quickly as possible to purge pump and lines, then repeat mixing and application process.*
- D. Application Rates: These application rates are for standard conditions. Designers may need to increase application rates on rough or rocky surfaces.

% Organic Matter	Rate (lb/acre)	Rate (kg/ha)
< 0.75	5,000	5,600
≥ 0.75 & < 1.5	4,500	5,040
≥ 1.5 & < 2.0	4,000	4,480
≥ 2.0 & < 5.0	3,500	3,920

3.05 CLEANING AND PROTECTION

- A. Always flush residual slurry from hydraulic seeding/mulching equipment immediately following each application, at the end of each work period or when equipment will be left unattended. Compounds containing residual Urea, Nitrogen, Phosphorus, Potassium and other substances may form and can be hazardous to human health and equipment.
- B. Clean spills promptly. Advise owner of methods for protection of treated areas. Do not allow treated areas to be trafficked or subjected to grazing.

3.06 INSPECTION AND MAINTENANCE

- A. All inspections and maintenance recommendations shall be conducted by qualified professionals consistent with the owner, engineer/specifier and regulatory entity(s) expectations.
- B. Initial inspections shall insure installations are in accordance with the project plans and specifications with material quantities and activities fully documented. Refer to Section 32 92 00 – Turf and Grasses for any additional details.
- C. Subsequent inspections shall be conducted at pre-determined time intervals and corrective maintenance activities directed after each significant precipitation or other potentially damaging weather or site event.

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Revision Date: 11/2022